FIG. 1
PRIOR ART

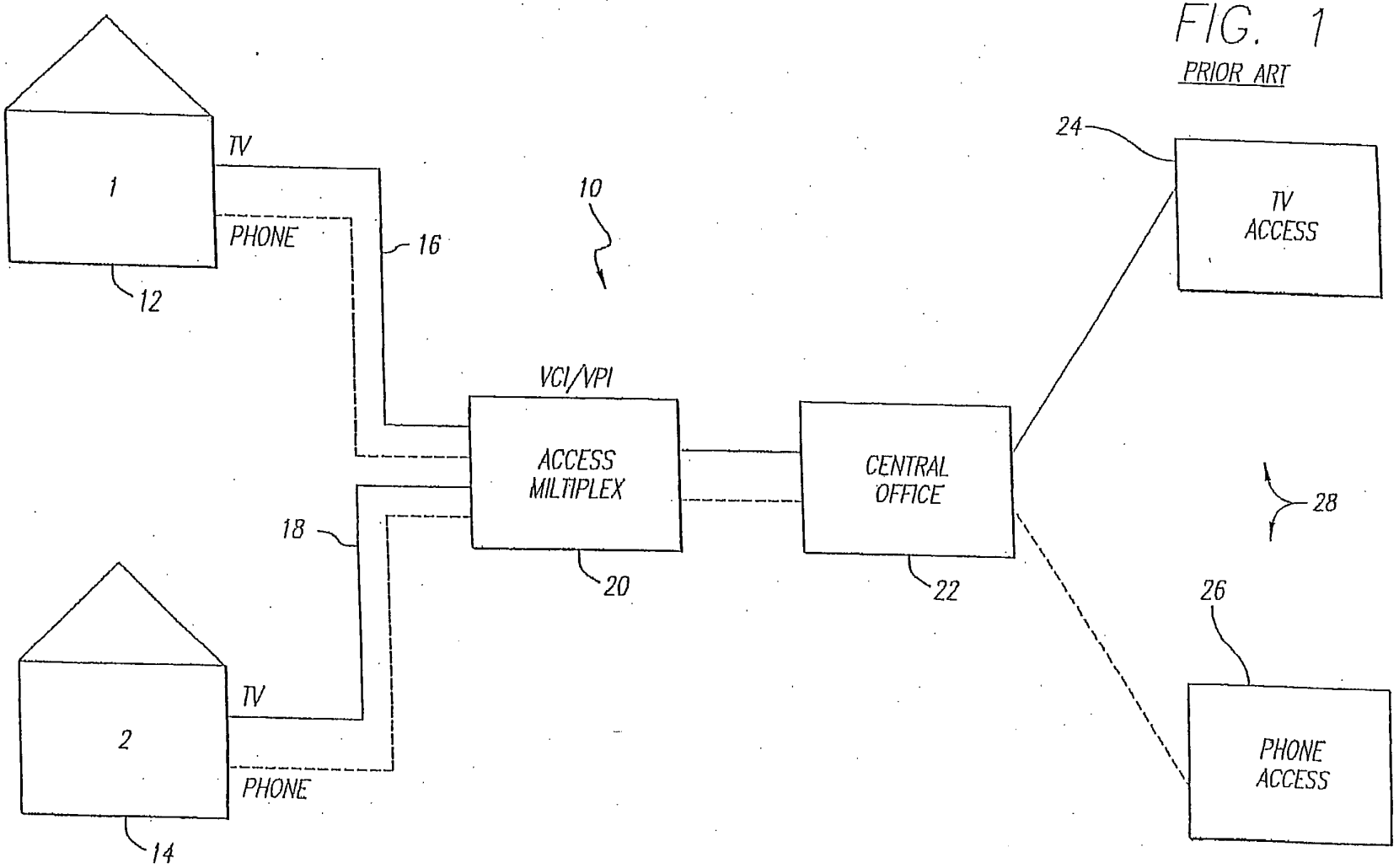

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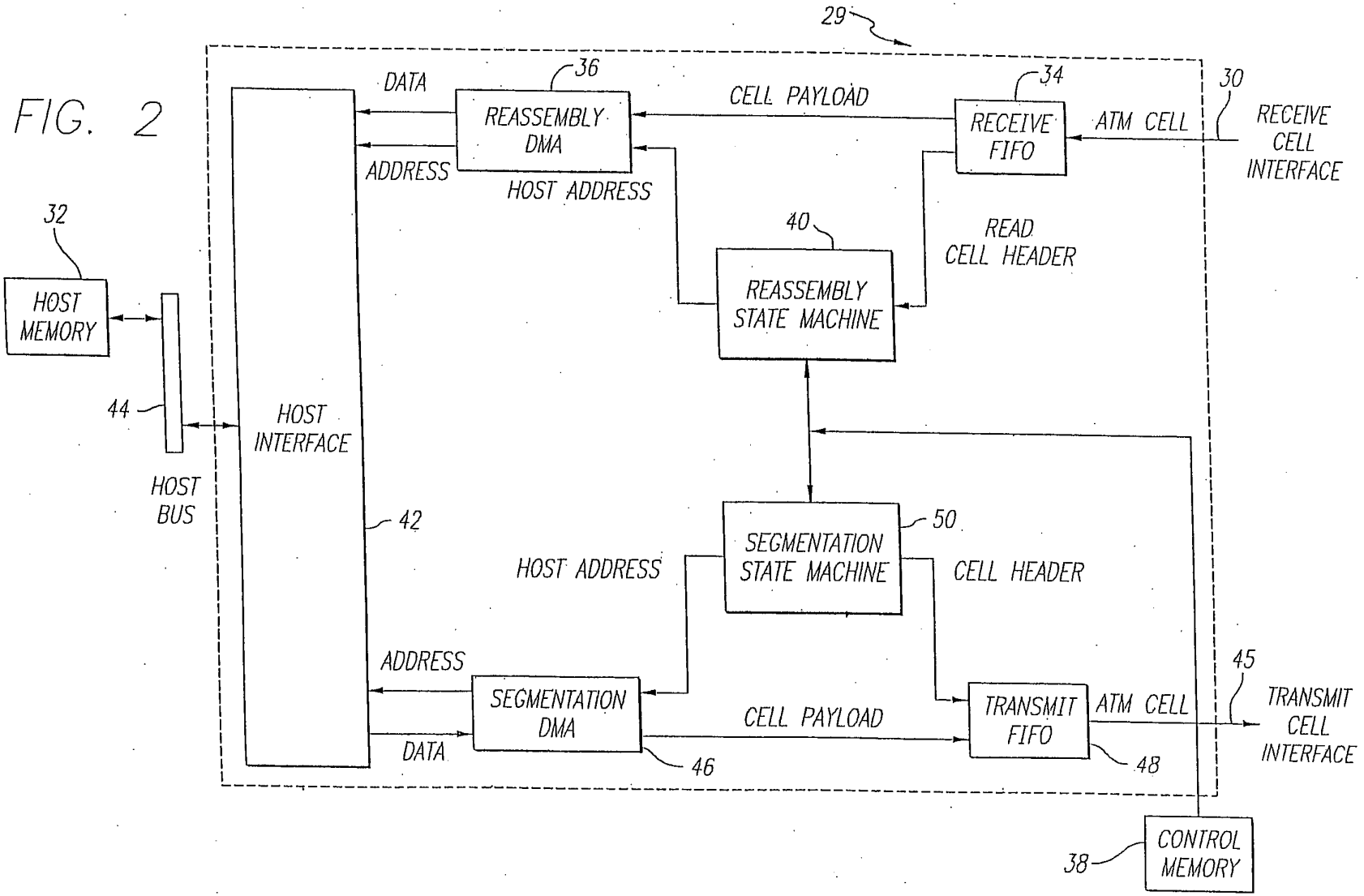
FIG. 2


29
DATA
36
CELL PAYLOAD
34
30
REASSEMBLY DMA
RECEIVE FIFO
ATM CELL
RECEIVE CELL INTERFACE
ADDRESS
HOST ADDRESS
32
40
READ CELL HEADER
HOST MEMORY
REASSEMBLY STATE MACHINE
44
HOST INTERFACE
HOST BUS
42
50
SEGMENTATION STATE MACHINE
HOST ADDRESS
CELL HEADER
ADDRESS
45
SEGMENTATION DMA
CELL PAYLOAD
TRANSMIT FIFO
ATM CELL
TRANSMIT CELL INTERFACE
DATA
46
48
CONTROL MEMORY
38

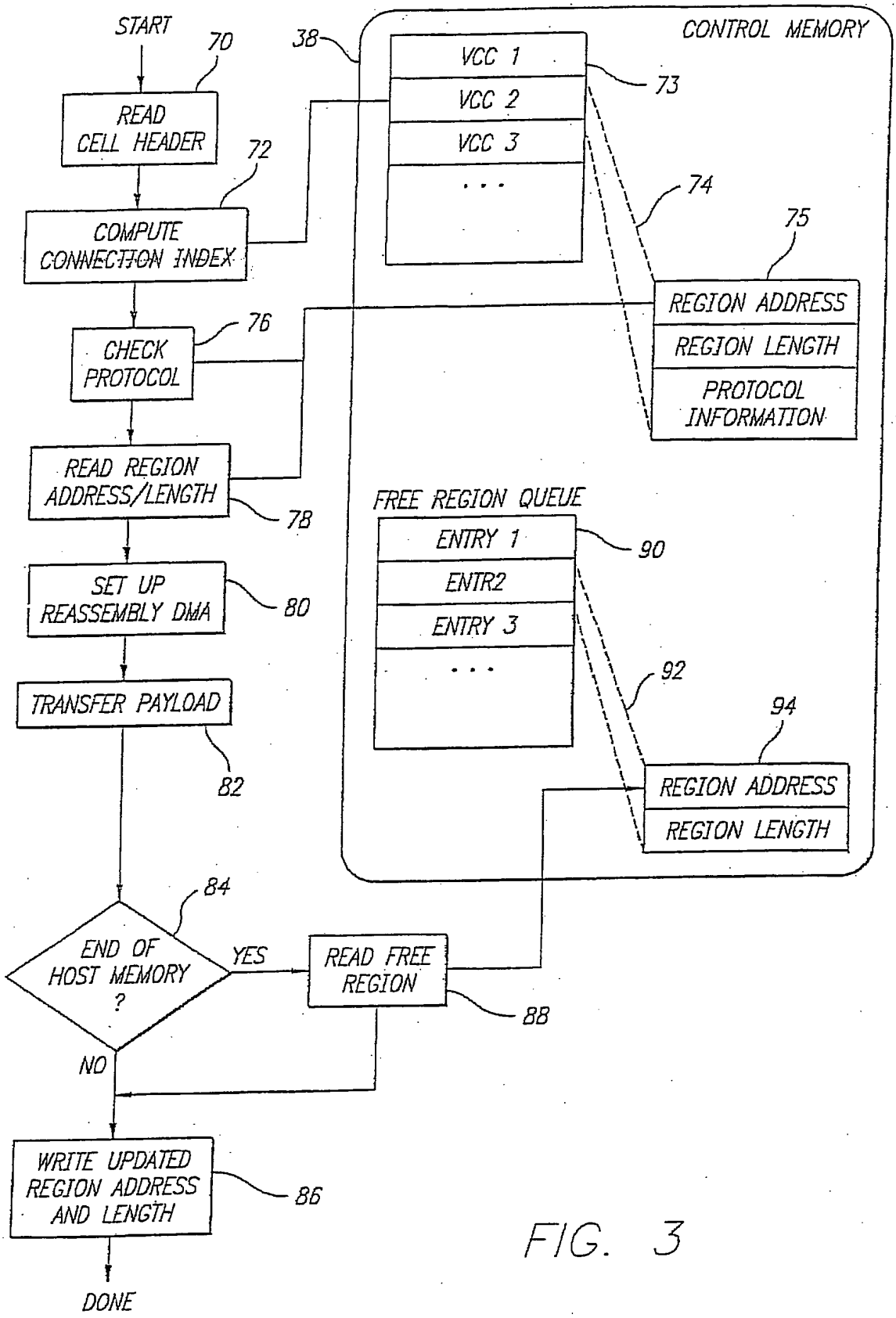

START
70
READ CELL HEADER
72
COMPUTE CONNECTION INDEX
76
CHECK PROTOCOL
READ REGION ADDRESS/LENGTH
78
SET UP REASSEMBLY DMA
80
TRANSFER PAYLOAD
82
84
END OF HOST MEMORY ?
YES
NO
READ FREE REGION
88
WRITE UPDATED REGION ADDRESS AND LENGTH
86
DONE
CONTROL MEMORY
38
VCC 1
VCC 2
VCC 3
. . .
73
74
75
REGION ADDRESS
REGION LENGTH
PROTOCOL INFORMATION
FREE REGION QUEUE
ENTRY 1
ENTR2
ENTRY 3
. . .
90
92
94
REGION ADDRESS
REGION LENGTH

FIG. 3

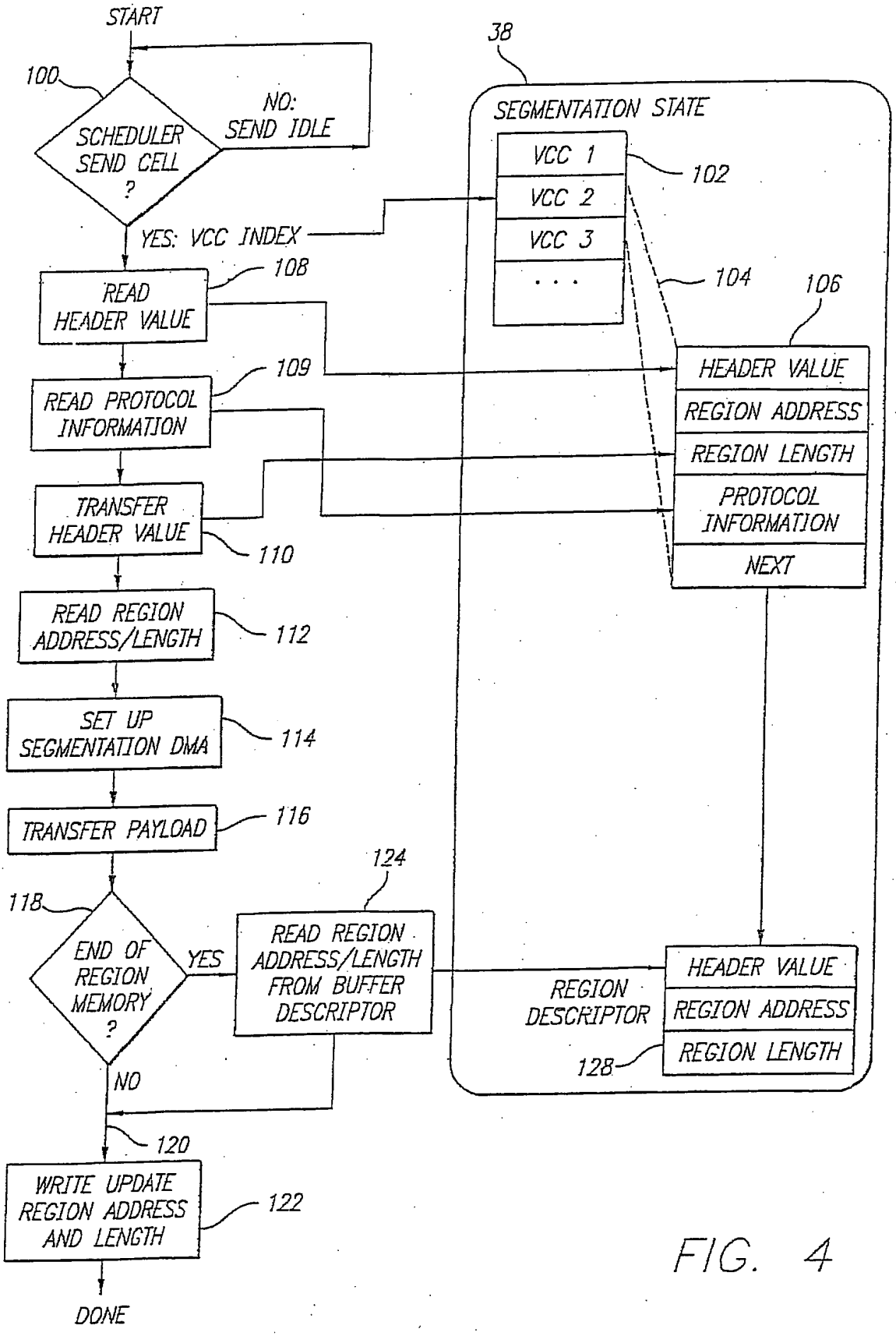

START
100
SCHEDULER SEND CELL ?
NO: SEND IDLE
YES: VCC INDEX
108
READ HEADER VALUE
109
READ PROTOCOL INFORMATION
TRANSFER HEADER VALUE
110
READ REGION ADDRESS/LENGTH
112
SET UP SEGMENTATION DMA
114
TRANSFER PAYLOAD
116
118
END OF REGION MEMORY ?
YES
NO
124
READ REGION ADDRESS/LENGTH FROM BUFFER DESCRIPTOR
120
WRITE UPDATE REGION ADDRESS AND LENGTH
122
DONE
38
SEGMENTATION STATE
VCC 1
VCC 2
VCC 3
. . .
102
104
106
HEADER VALUE
REGION ADDRESS
REGION LENGTH
PROTOCOL INFORMATION
NEXT
REGION DESCRIPTOR
HEADER VALUE
REGION ADDRESS
REGION LENGTH
128

FIG. 4

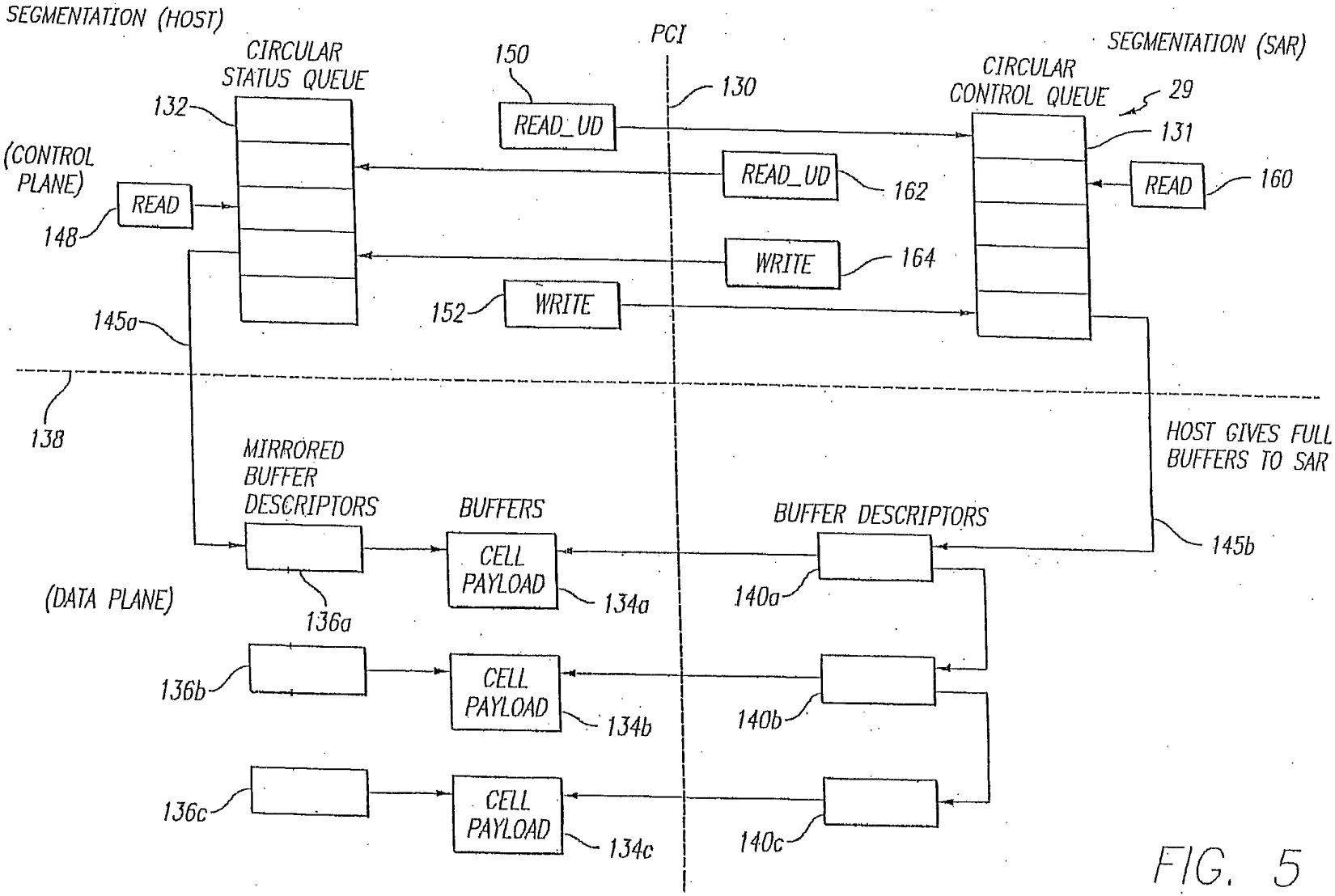

SEGMENTATION (HOST)
CIRCULAR STATUS QUEUE
132
150
READ_UD
PCI
130
SEGMENTATION (SAR)
CIRCULAR CONTROL QUEUE
29
131
(CONTROL PLANE)
READ
148
READ_UD
162
READ
160
WRITE
164
152
WRITE
145a
138
HOST GIVES FULL BUFFERS TO SAR
MIRRORED BUFFER DESCRIPTORS
BUFFERS
BUFFER DESCRIPTORS
145b
(DATA PLANE)
CELL PAYLOAD
134a
140a
136a
136b
CELL PAYLOAD
134b
140b
136c
CELL PAYLOAD
134c
140c

FIG. 5

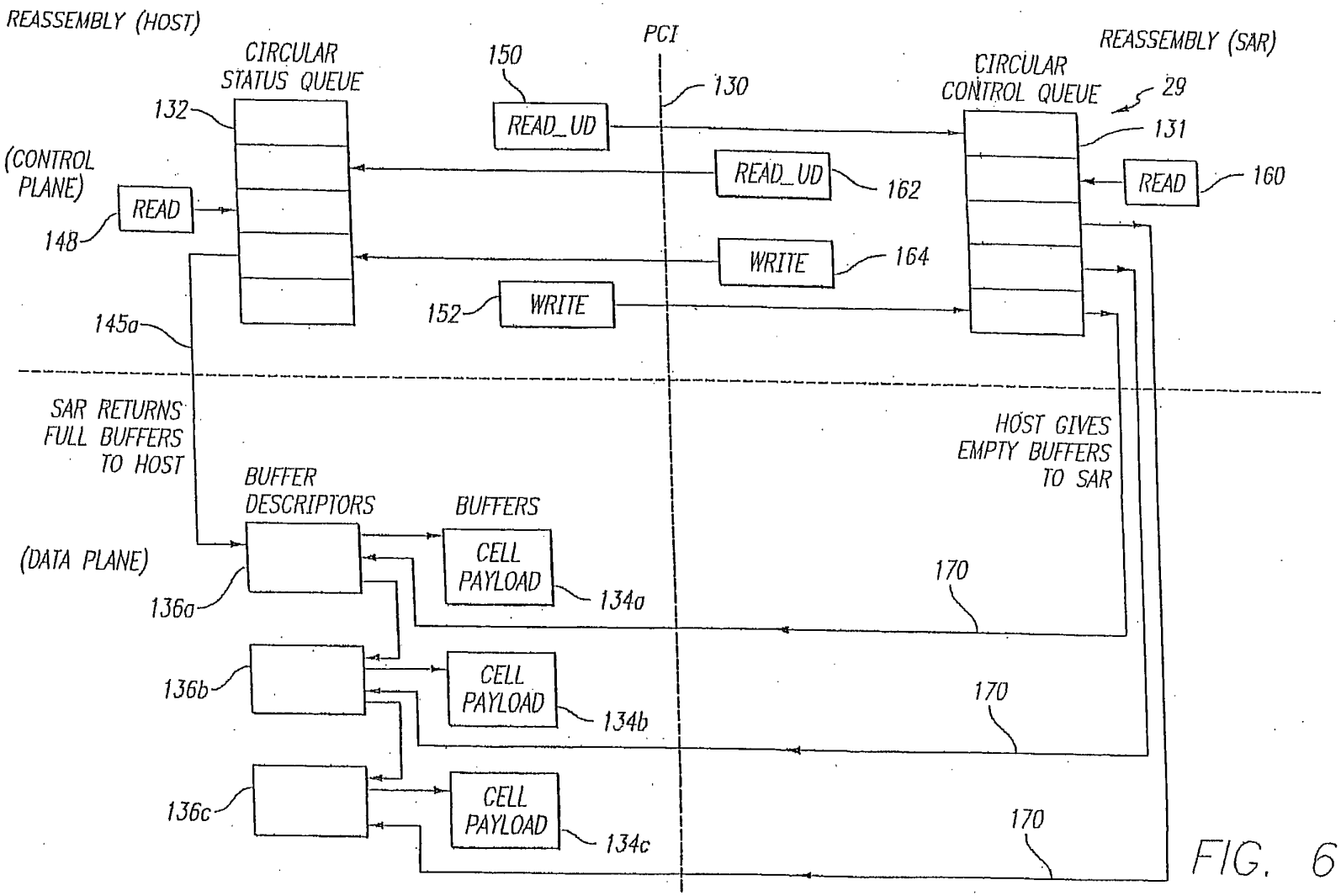

REASSEMBLY (HOST)
CIRCULAR STATUS QUEUE
132
150
READ_UD
PCI
130
REASSEMBLY (SAR)
CIRCULAR CONTROL QUEUE
29
131
READ_UD
162
READ
160
(CONTROL PLANE)
READ
148
WRITE
164
WRITE
152
145a
SAR RETURNS FULL BUFFERS TO HOST
HOST GIVES EMPTY BUFFERS TO SAR
BUFFER DESCRIPTORS
BUFFERS
(DATA PLANE)
CELL PAYLOAD
136a
134a
170
136b
134b
136c
134c

FIG. 6

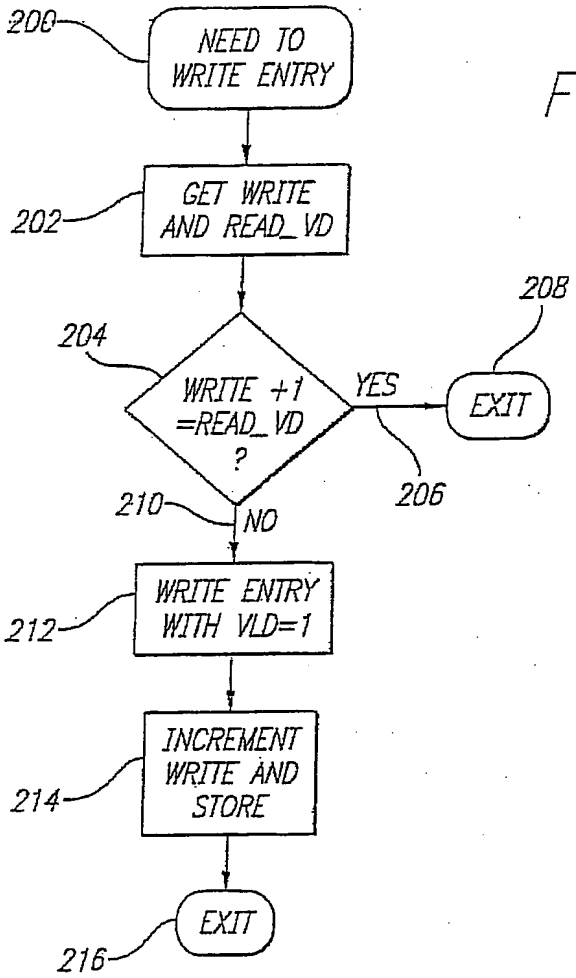
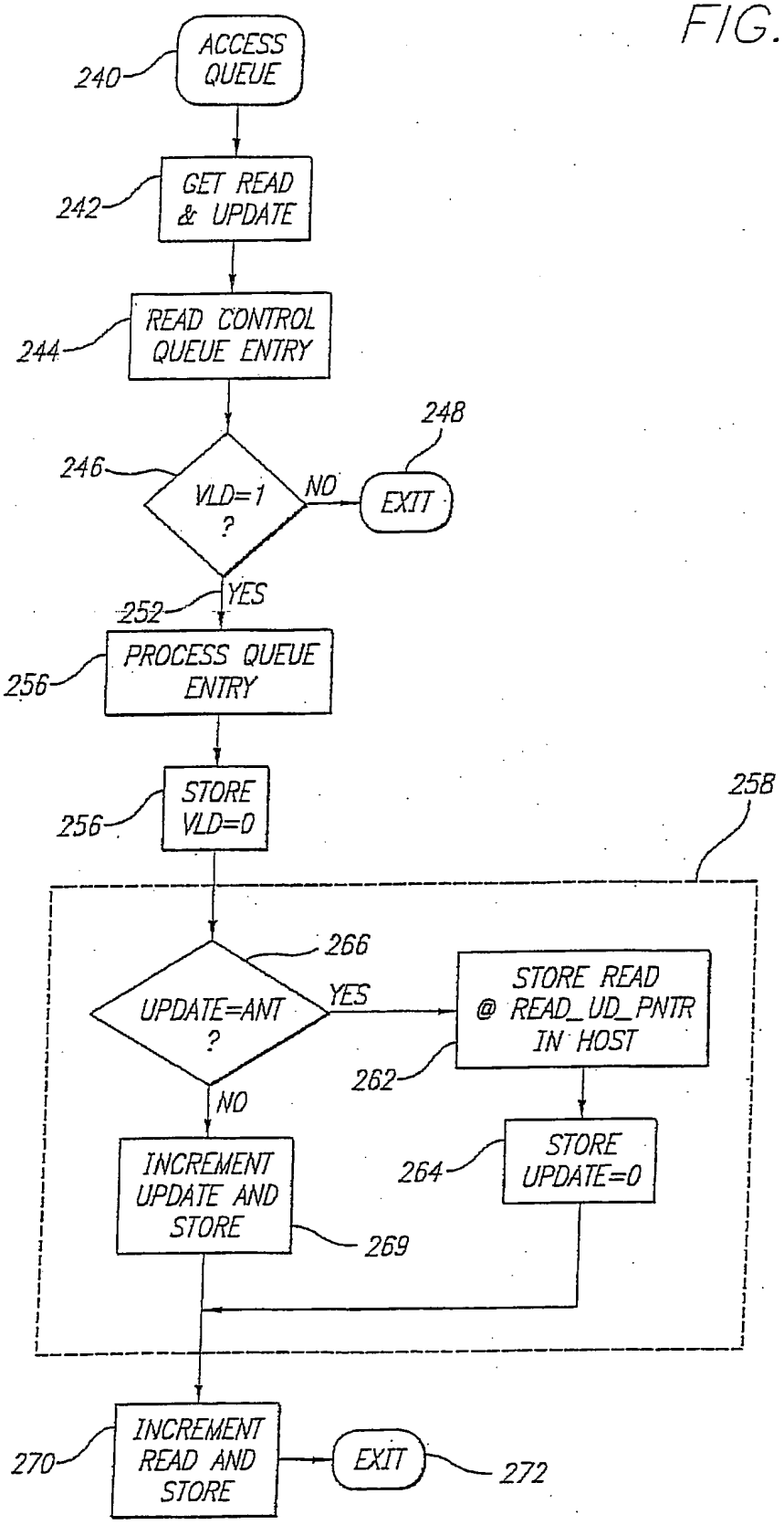

200
NEED TO WRITE ENTRY
202
GET WRITE AND READ_VD
204
WRITE +1 =READ_VD ?
YES
208
EXIT
206
210
NO
212
WRITE ENTRY WITH VLD=1
214
INCREMENT WRITE AND STORE
216
EXIT

FIG. 7

FIG. 8


ACCESS QUEUE
240
GET READ & UPDATE
242
READ CONTROL QUEUE ENTRY
244
248
246
VLD=1 ?
NO
EXIT
YES
252
PROCESS QUEUE ENTRY
256
STORE VLD=0
256
258
266
UPDATE=ANT ?
YES
STORE READ @ READ_UD_PNTR IN HOST
262
NO
INCREMENT UPDATE AND STORE
269
STORE UPDATE=0
264
INCREMENT READ AND STORE
270
EXIT
272

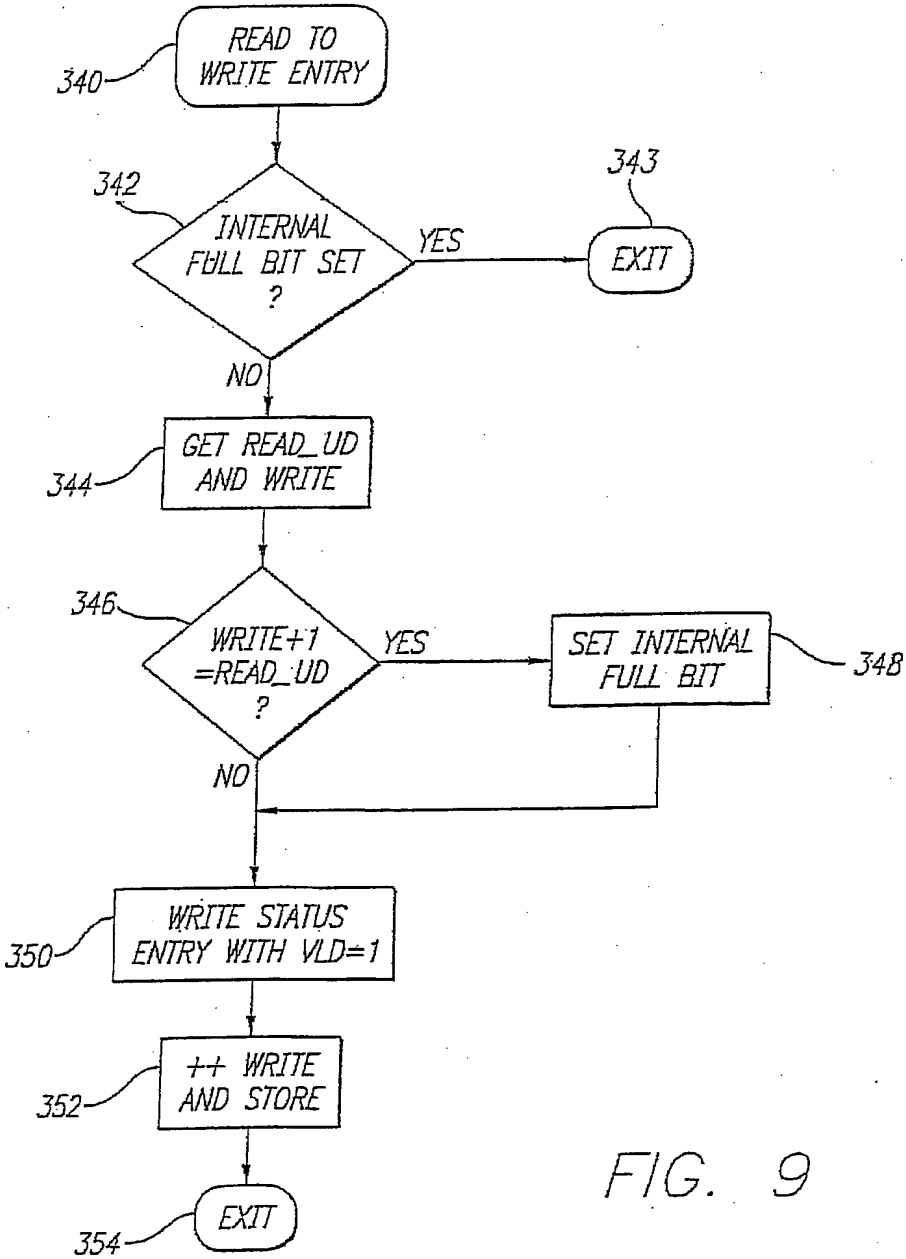

READ TO WRITE ENTRY
340
342
INTERNAL FULL BIT SET ?
YES
343
EXIT
NO
GET READ_UD AND WRITE
344
346
WRITE+1 =READ_UD ?
YES
SET INTERNAL FULL BIT
348
NO
WRITE STATUS ENTRY WITH VLD=1
350
++ WRITE AND STORE
352
EXIT
354

FIG. 9

FIG. 10

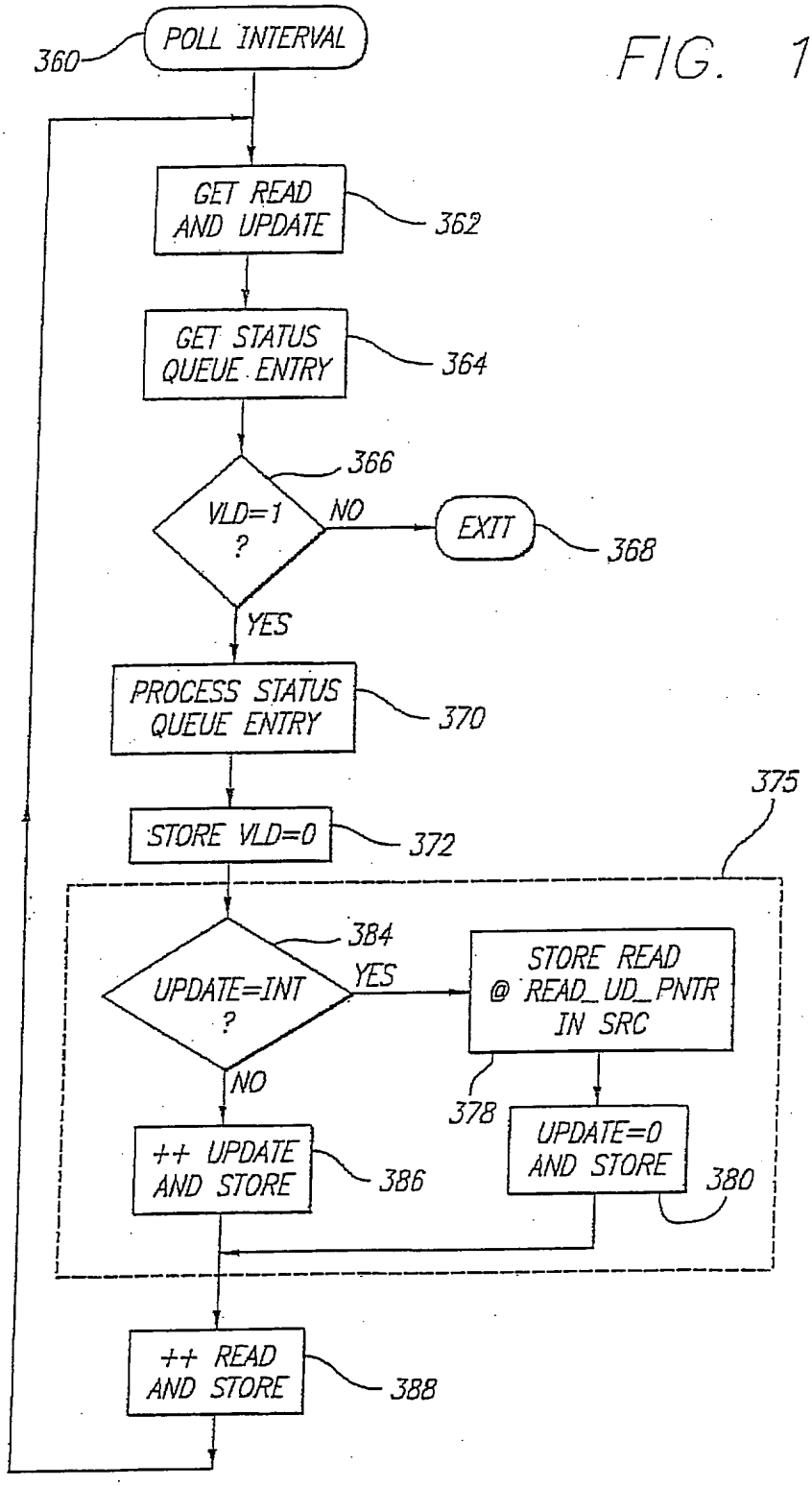

POLL INTERVAL
360
GET READ AND UPDATE
362
GET STATUS QUEUE ENTRY
364
366
VLD=1 ?
NO
EXIT
368
YES
PROCESS STATUS QUEUE ENTRY
370
375
STORE VLD=0
372
384
UPDATE=INT ?
YES
STORE READ @ READ_UD_PNTR IN SRC
NO
378
++ UPDATE AND STORE
386
UPDATE=0 AND STORE
380
++ READ AND STORE
388

FIG. 11

WRITE-ONLY CONTROL QUEUE VARIABLES

VARIABLE	DEFINITION	LOCATION
WRITE	CURRENT HOST POSITION IN CONTROL QUEUE	HOST VARIABLE
READ_UD	LAST KNOWN SAR POSITION IN CONTROL QUEUE AS SEEN BY HOST	HOST VARIABLE
READ	CURRENT SAR POSITION IN CONTROL QUEUE	SAR BASE TABLE
INTERVAL	NUMBER OF QUEUE ENTRIES PROCESSED BY SAR BEFORE WRITING READ_UD	SAR REGISTER
UPDATE	NUMBER OF QUEUE ENTRIES SINCE LAST WRITE OF READ_UD FROM HOST	SAR BASE TABLE
READ_UD_PNTR	SAR POINTER TO READ_UD	SAR BASE TABLE

FIG. 12

WRITE-ONLY STATUS QUEUE VARIABLES

VARIABLE	DEFINITION	LOCATION
WRITE	CURRENT SAR POSITION IN STATUS QUEUE	SAR BASE TABLE
READ_UD	HOST KNOWN HOST POSITION IN STATUS QUEUE AS SEEN BY SAR	SAR BASE TABLE
READ	CURRENT HOST POSITION IN STATUS QUEUE	HOST VARIABLE
INTERVAL	NUMBER OF QUEUE ENTRIES PROCESSED BY HOST BEFORE WRITING READ_UD	HOST VARIABLE
UPDATE	NUMBER OF QUEUE ENTRIES SINCE LAST WRITE OF READ_UD	HOST VARIABLE
READ_UD_PNTR	HOST POINTER TO READ_UD	HOST VARIABLE